

What is claimed is:

1. A progressive 3-D mesh information coding method comprising the

steps of:

(a) dividing a 3-D mesh into a plurality of mesh components;

(b) coding each of the plurality of mesh components; and

(c) multiplexing the plurality of coded mesh components into a compressed bit stream and transmitting the compressed bit stream.

2. The progressive 3-D mesh information coding method as claimed in claim 1, wherein each of the plurality of mesh components includes at least connectivity information, geometry information and photometry information which are necessary to reconstruct the coded mesh components themselves.

3. The progressive 3-D mesh information coding method as claimed in claim 1, wherein the step (a) comprises the substeps of:

(a1) extracting one or more mesh object layeres from a 3-D mesh; and

(a2) dividing one or more mesh object layeres each into a plurality of mesh components.

4. The progressive 3-D mesh information coding method as claimed in claim 1, wherein in the step (b), each of the plurality of mesh components is coded, and information generated while a mesh component is coded is reused in the process for coding a mesh component which has not yet been coded.

5. A progressive 3-D mesh information decoding method comprising the steps of:

(a) dividing a transmitted bit stream into a plurality of coded mesh components;

(b) decoding each of the plurality of coded mesh components; and

(c) reconstructing a 3-D mesh by synthesizing the plurality of decoded mesh components.

1 6. The progressive 3-D mesh information decoding method as claimed in
2 claim 5, wherein the step (a) comprises the substeps of:

3 (a1) classifying the transmitted bit stream into one or more decoded mesh
4 object layeres; and

5 (a2) dividing each of the one or more decoded mesh object layeres into a
6 plurality of mesh components.

1 7. The progressive 3-D mesh information decoding method as claimed in
2 claim 5, wherein in the step (b), each of the plurality of coded mesh components is
3 decoded, and information generated while a mesh component is decoded is reused in
4 the process for decoding a mesh component which has not yet been decoded.

5 8. A progressive 3-D mesh information coding/decoding method
6 comprising the steps of:

7 (a) extracting one or more independent mesh object layers from a 3-D mesh;

8 (b) independently coding and transmitting the one or more mesh object
9 layeres; and

10 (c) obtaining one or more independent mesh object layeres by decoding one or
11 more of the independently coded and transmitted mesh object layeres.

12 9. The progressive 3-D mesh information coding/decoding method as
13 claimed in claim 8, further comprising the step of (d) reconstructing the original 3-D
14 mesh by collecting the independent mesh object layeres and removing redundant
15 information, after step (c).

16 10. A progressive 3-D mesh information coding/decoding method
17 comprising the steps of:

18 (a) extracting one or more mesh object layers from a 3-D mesh and dividing
19 each of the mesh object layers into a plurality of independent mesh components;

20 (b) independently coding and transmitting the plurality of mesh components for
21 each of the one or more mesh object layers; and

7 (c) obtaining a plurality of independent mesh components by decoding the
8 plurality of independently coded and transmitted mesh components.

1 11. The progressive 3-D mesh information coding/decoding method as
2 claimed in claim 10, further comprising the step of (d) reconstructing the original 3-D
3 mesh by collecting the independent mesh components and removing redundant
4 information between adjacent mesh components, after step (c).

1 12. A progressive 3-D mesh information coding apparatus comprising:
2 a 3-D data analyzer for receiving a 3-D mesh and reconstructing the input 3-D
3 mesh into a plurality of mesh components;
4 a plurality of component coders for coding the plurality of mesh components;
5 and
6 a multiplexer for multiplexing the plurality of coded mesh components into a
7 compressed bit stream.

1 13. The progressive 3-D mesh information coding apparatus as claimed in
2 claim 12, wherein the 3-D data analyzer comprises:
3 a 3-D mesh object layer analyzer for dividing the input 3-D mesh into one or
4 more mesh object layers; and
5 a plurality of mesh component analyzers for again dividing each of one or
6 more mesh object layers into a plurality of mesh components.

1 14. The progressive 3-D mesh information coding apparatus as claimed in
2 claim 12, wherein when the plurality of component coders code the plurality of mesh
3 components, a component coder which has not yet performed coding performs
4 coding using coding information generated in a component coder which has already
5 performed coding.

1 15. A progressive 3-D mesh information decoding apparatus for
2 progressively decoding a bit stream decoded by and transmitted from a progressive
3 3-D mesh information coding apparatus, comprising:
4 a demultiplexer for dividing the transmitted bit stream into a plurality of coded
5 mesh components;
6 a plurality of component decoders for decoding the plurality of coded mesh
7 components; and
8 a 3-D data synthesizer for synthesizing the plurality of decoded mesh
9 components to reconstruct a 3-D mesh.

1 16. The progressive 3-D mesh information decoding apparatus as claimed
2 in claim 15, wherein when the plurality of component decoders decode the plurality of
3 mesh components, a component decoder which has not yet performed decoding
4 performs decoding using decoding information generated in a component decoder
5 which has already performed decoding.

1 17. A progressive 3-D mesh information coding/decoding apparatus
2 comprising:
3 a 3-D mesh object layer analyzer for receiving a 3-D mesh and dividing an
4 input 3-D mesh into one or more independent mesh object layeres;
5 one or more mesh object layer coders for independently coding and
6 transmitting one or more mesh object layeres; and
7 one or more mesh object layer decoders for decoding one or more
8 independent mesh object layeres which are independently coded and transmitted, to
9 obtain one or more independent mesh object layeres.

1 18. An independent and progressive 3-D mesh information coding/decoding
2 apparatus as claimed in claim 17, further comprising a 3-D mesh object layer
3 synthesizer for synthesizing one or more independent mesh object layeres and
4 removing redundant information to reconstruct the original 3-D mesh.

1 19. A progressive 3-D mesh information coding/decoding apparatus
2 comprising:
3 a 3-D mesh object layer analyzer for receiving a 3-D mesh, dividing an input 3-
4 D mesh into one or more mesh object layers, and again dividing each mesh object
5 layer into a plurality of independent mesh components;
6 a plurality of mesh component coders for independently coding and
7 transmitting the plurality of mesh object layers; and
8 a plurality of mesh component decoders for decoding the plurality of mesh
9 components which are independently coded and transmitted, to obtain a plurality of
10 independent mesh components.

1 20. ✓ An independent and progressive 3-D mesh information coding/decoding
2 apparatus as claimed in claim 19, further comprising a 3-D step data synthesizer for
3 synthesizing the plurality of independent mesh components and removing redundant
4 information between adjacent mesh components to reconstruct the original 3-D mesh.